PFAS Research

ISSUE SUMMARY:

For an Overview of EPA's work on PFAS and a summary of the overall issue, please see AO Briefing Paper: PFAS Overview

Additional information about PFAS chemicals is needed to better understand the risk associated with this class of substances. This is why EPA has placed such a strong emphasis on research and why this work continues to be vital to efforts to address PFAS. This work is outlined in Chapter 7 of EPA's PFAS Action Plan.

EPA's Office of Research and Development (ORD) is conducting PFAS work in the following areas:

- methods to detect and measure PFAS in environmental media;
- PFAS human and ecological toxicity;
- analyzing human and ecological exposure to PFAS;
- removing PFAS from drinking water; and
- approaches for managing and disposing of PFAS.

EPA completes much of this work in-house, but also funds extramural PFAS research to complement these efforts. More information on these areas of research is included in the Background section below.

EPA's Office of Research and Development collaborates closely with Program and Regional Offices: soliciting input on the research needed to support Agency decisions; sharing awareness of ORD plans and actions; and seeking review and awareness of draft ORD research products. EPA's research is helping to deepen the Agency's understanding of these chemicals so that the Agency can take the right steps to continue reducing the risks to public health and provide greater certainty to our state customers.

UPCOMING MILESTONES:

- **PFBS Toxicity Assessment** – Expect to release the final PFBS toxicity assessment in Fall/Winter 2020
- **Ecological Risk Assessment -** Evaluation of existing ERA tools and PFAS data to support decision making, expected late 2020
- **Analytical Methods** - Publish draft OTM-45 method for sampling and analyzing PFAS in air emissions, expected late 2020
- **Drinking Water Treatment** – Pilot scale testing of efficacy of ion exchange treatment for PFAS removal, expected late 2021

BACKGROUND:

Areas of Research

Methods to Detect and Measure PFAS in Environmental Media

Researchers have developed standard methods for measuring PFAS in drinking water are now developing and validating analytical methods for identifying and quantifying PFAS in surface water, ground water, wastewater, soils, sediments and biosolids; developing new methods to test for PFAS in air and emissions; and improving laboratory methods (high resolution mass spectrometry methods) to discover unknown PFAS. EPA is also working with DoD to develop and validate a method for identifying and quantifying PFAS in surface water, ground water, wastewater, soils, sediments and biosolids. These methods will help EPA, other federal agencies, states, and others better understand what PFAS are currently in the environment and to understand how people might be exposed.

PFAS Toxicity

Researchers are working to understand how toxic or harmful PFAS are to people and to the environment. These studies allow the Agency to better understand how harmful specific chemicals can be and help prioritize the Agency's work to protect public health, for example by providing the scientific basis for setting regulatory limits for chemicals deemed to be sufficiently risky.

EPA continues to compile and assess human and ecological toxicity information on PFAS to support risk management decisions. This work includes the following activities:

- EPA expected to complete a peer-reviewed toxicity assessment for PFBS in Fall/Winter 2020. EPA is also working on finalizing the toxicity assessment for GenX chemicals.
- EPA is developing peer-reviewed toxicity assessments via the Agency's IRIS program for PFBA, PFHxA, PFHxS, PFNA, and PFDA to support stakeholders.
- EPA is applying high-throughput toxicology testing to study the toxicity of the larger universe of PFAS. This information will be used to support prioritization of PFAS for further studies, and to feed into New Approach Methods for assessing PFAS toxicity using high throughput data.

Analyzing Exposure

Researchers are developing and testing ways to describe and understand where PFAS come from, how they move and change through the environment, and how people and ecosystems are exposed. This includes developing databases so the Agency can see where PFAS may be in the environment and developing models that help predict the most important sources pathways contributing to human exposures. This information can be used by Agency and state risk managers to reduce risk by preventing exposures.

Removing PFAS from Drinking Water

Researchers are studying how effective various technologies and treatment approaches are at removing different kinds of PFAS from drinking water. This includes quantifying both the cost and the effectiveness of different approaches, so that utility operators have the information they need to design effective treatment systems for their situation. Researchers are also studying different kinds of household water filters so that you have the information needed to protect the water in a home.

Managing and Disposing of PFAS

Researchers are working to understand how materials that contain PFAS should be safely managed and disposed. EPA researchers are identifying the best ways to dispose of PFAS (e.g., incineration, landfilling, composting) and to understand how PFAS at a contaminated industrial site may move into the nearby environment.

PFAS Research

PFAS Innovative Treatment Team (PITT)

The PITT was a full-time, multi-disciplined research team concentrating on a single problem for six months: how to remove, destroy, and test PFAS-contaminated media and waste. This effort ended on September 30, 2020. The PITT's focus was to:

- Assess current and emerging methods being explored by EPA, universities, other research organizations, and industry
- Evaluate efficacy of promising approaches considering byproducts to avoid creating new environmental hazards
- Evaluate feasibility, performance, and economic considerations to validate potential solutions

This information is providing states, tribes, and local governments with data on viable approaches for destruction/disposal of PFAS, which will lead to increased confidence in cleanup operations and safer communities. The most ambitious work of the PITT will likely yield results in FY 2021 and beyond. The PITT has laid the groundwork for several high impact, potentially game changing, efforts to treat PFAS in a variety of contaminated media and products. While the PITT will no longer be operating as a functioning team, ORD and the PITT members have committed to complete projects already initiated.

Extramural Research

To complement our in-house research efforts, EPA is also funding extramural research to generate science-based recommendations for managing PFAS in rural and agricultural areas, and to expand the understanding of environmental risks posed by PFAS in water and waste streams. In August 2020, EPA announced almost $5 million in funding for new research on managing PFAS in rural and agricultural communities. This funding went to Indiana University, Purdue University, and the University of Georgia.

KEY EXTERNAL STAKEHOLDERS:

☒ Congress ☒ Industry ☒States ☒ Tribes ☒ Media ☒ Other Federal Agency
☒ NGO ☒ Local Government ☐ Other (Local unions)

States, tribes, and local governments are incredibly interested in this work as they require information on the best ways to detect, treat, and dispose of PFAS. EPA is working with other federal agencies (e.g., DoD) on work. Congress, NGOs, and the media are interested.

MOVING FORWARD:

- All areas of PFAS research will continue, including assessment work.

LEAD OFFICE/REGION: ORD OTHER KEY OFFICES/REGIONS: OW, OLEM, OAR